

UNITED STATES GEOLOGICAL SURVEY
J. W. POWELL DIRECTOR

ATLAS
TO ACCOMPANY
THE TERTIARY HISTORY
OF THE
GRAND CAÑON DISTRICT

DUTTON



DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY
J.W. POWELL DIRECTOR

ATLAS
TO ACCOMPANY THE MONOGRAPH
ON THE
TERTIARY HISTORY
OF THE
GRAND CAÑON DISTRICT

BY
CAPT. CLARENCE E. DUTTON U.S.A.



WASHINGTON 1882

JULIUS BIEN & CO. LITH NEW YORK

LIST OF ATLAS SHEETS.

- SHEET I. Title page and Table of Contents.
- SHEET II. Sketch map showing the approximate distribution of the strata in the western part of the Southern Plateau Province. Scale, $\frac{1}{1,000,000}$. The topography of the colored portion is compiled by J. H. Renshawe, from data and surveys by the U. S. Geographical and Geological Survey of the Rocky Mountain Region, J. W. Powell in charge, and by the United States Geological Survey, Clarence King, Director. The topography of the uncolored portion is compiled largely from surveys under the direction of Capt. George M. Wheeler, U. S. Engineers. Geology by C. E. Dutton.
- SHEET III. Sketch map showing the approximate arrangement of the principal faults and displacements in the District of the High Plateaus, and in the Grand Cañon District. The topography is the same as that of the preceding sheet.
- SHEET IV. Panoramic view of the Temples and Towers of the Virgen. Drawn by William H. Holmes.
- SHEET V. View of the Toroweap Valley looking north from Vulcan's Throne, and view of the Uinkaret Plateau looking northwest from the same standpoint. The two views are continuous. Drawn by William H. Holmes.
- SHEET VI. View looking eastward from Vulcan's Throne disclosing the Inner Gorge of the Grand Cañon, the great esplanade, and the upper or outer walls on either hand. Drawn by William H. Holmes.
- SHEETS VII and VIII. Map of the Uinkaret Plateau. Topography by J. H. Renshawe. Geology by C. E. Dutton. Scale, one mile to the inch.
- SHEET IX. Panoramic views from the summit of Mount Trumbull, on the Uinkaret Plateau looking eastward and southward, with distant glimpses of the Kanab division of the Grand Cañon and some of its lateral gorges.
- SHEET X. Two views—one looking northward from the summit of Mount Trumbull, the other looking north and northeast from the summit of Mount Emma—exhibiting the basaltic cinder cones of the Uinkaret Plateau. Drawn by William H. Holmes.
- SHEETS XI, XII, XIII, and XIV. Map of the southern portion of the Kaibab Plateau, and of the Kaibab division of the Grand Cañon, and of the lower portion of the Marble Cañon. Topography by Sumner H. Bodfish, and geology by C. E. Dutton. Scale, one mile to the inch. The inner gorge, designated as an Archean area, contains remnants of Silurian strata, the extent and distribution of which are not at present accurately known.
- SHEETS XV, XVI, and XVII. The Panorama from Point Sublime in the Kaibab. The three sheets form one continuous panorama. Drawn by William H. Holmes.
- SHEET XVIII. The Fransept. View of a lateral gorge opening into one of the branches of the Bright Angel Amphitheater in the Kaibab. Drawn by Thomas Moran.
- SHEET XIX. View looking from the eastern brink of the Kaibab, and overlooking the Marble Cañon Platform. Drawn by William H. Holmes.
- SHEETS XX, XXI, XXII, and XXIII. Sheets from the General Topographic and Geologic Atlas of the United States Geological Survey.

It is to be regretted that the survey of this portion of the country is not yet sufficiently advanced to admit of the construction of two additional sheets required to complete the cartography of the Grand Cañon District. It was desired that this atlas should contain the two sheets lying west of Sheets XXII and XXIII of this atlas, but although much material has been obtained for their construction, much more is still required. No attempt to supply the defect has, therefore, been made in the present work.

GEOLOGICAL MAP OF THE
WESTERN PART OF THE PLATEAU PROVINCE

U.S. GEOLOGICAL SURVEY

GEOLOGY OF THE GRAND CAÑON DISTRICT



J. H. Renshaw, Del.

Johns Ben. (n) NY

Geology by C. E. DUTTON, Geologist-in-Charge.

Tertiary	Cretaceous	Jurassic	Trias	Permian	Carboniferous	Silurian	Archean	Trachyte & Granite & Andesite	Basalt
T	Cr	J	Tr	P	Cn	S	A	Ty	B

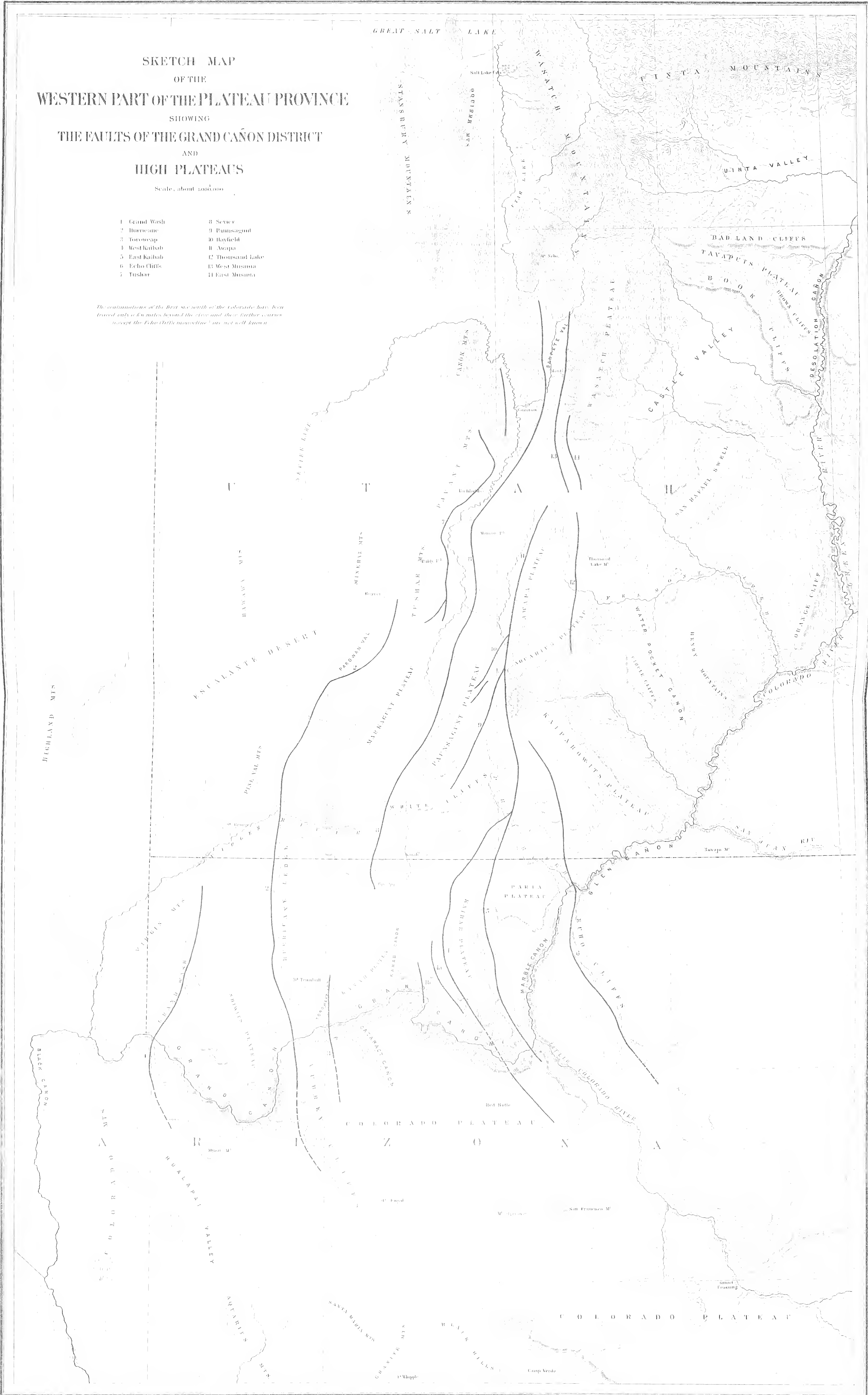
Scale: 16 miles = 1 inch or 1,600,000 nearly

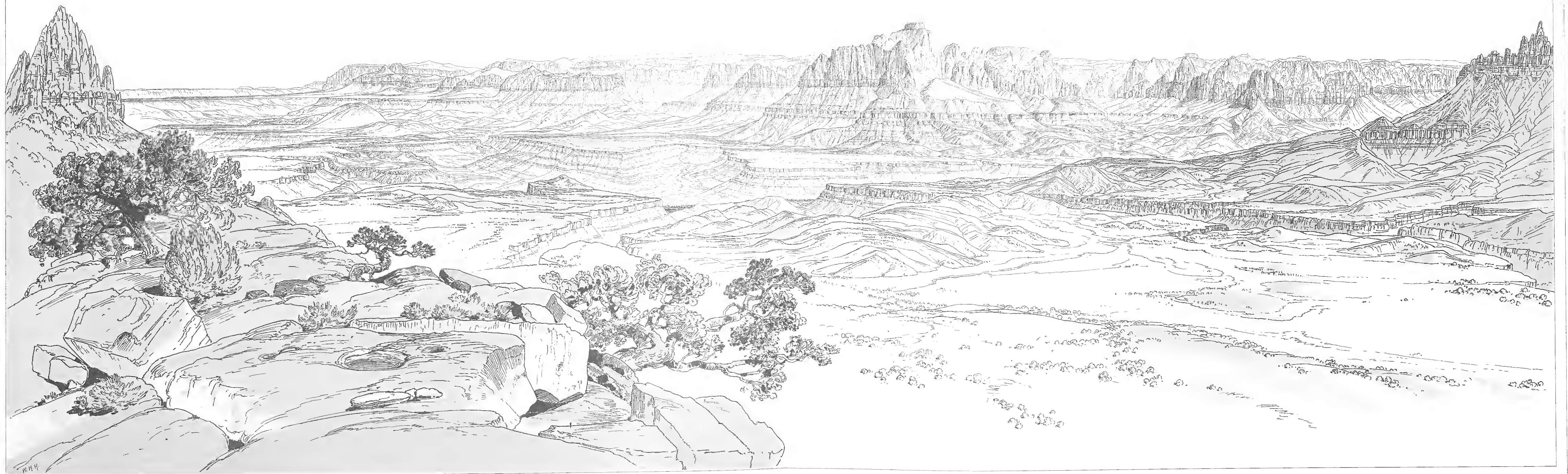
SKETCH MAP
OF THE
WESTERN PART OF THE PLATEAU PROVINCE
SHOWING
THE FAULTS OF THE GRAND CAÑON DISTRICT
AND
HIGH PLATEAUS

Scale, about 1:600,000

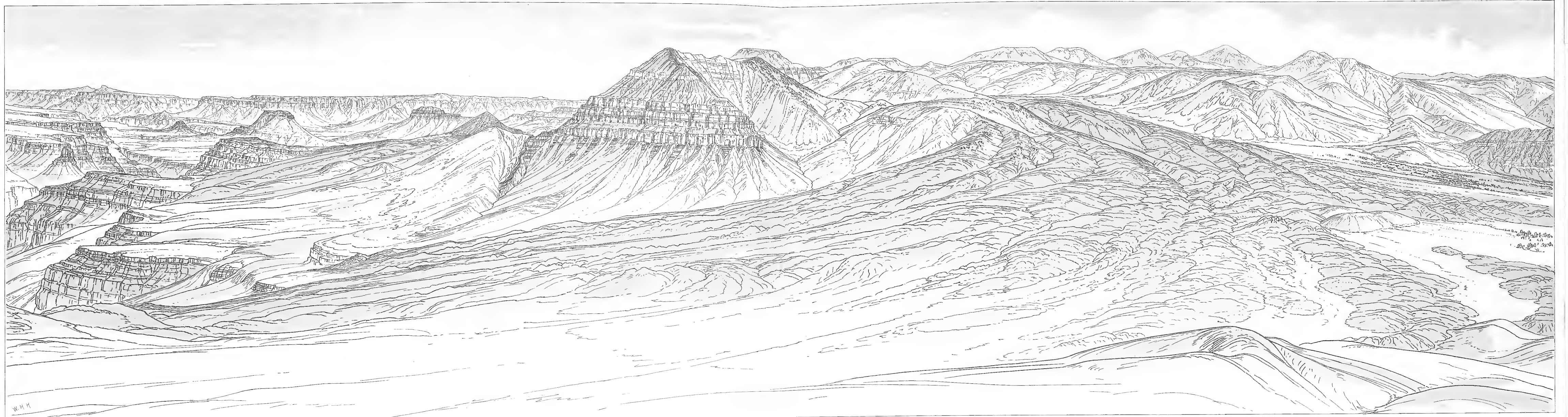
- | | |
|----------------|-------------------|
| 1. Grand Wash | 8. Sevier |
| 2. Hurricane | 9. Painsagunt |
| 3. Torowcap | 10. Hayfield |
| 4. West Kaibab | 11. Awapa |
| 5. East Kaibab | 12. Thousand Lake |
| 6. Echo Cliffs | 13. West Musina |
| 7. Tuskar | 14. East Musina |

The continuations of the first six south of the Colorado have been traced only a few miles beyond the river and their farther courses except the Echo Cliffs monocline are not well known





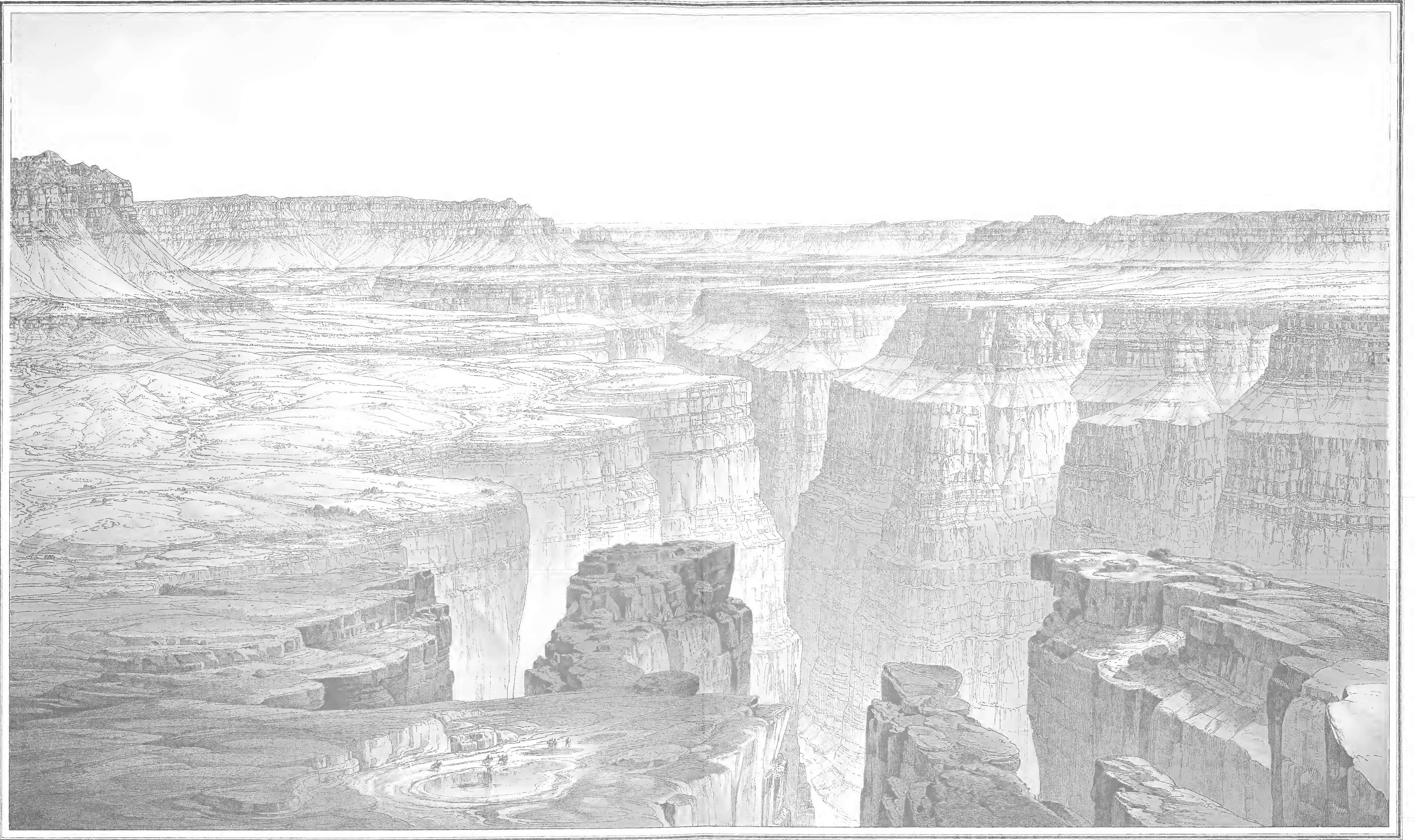
In the centre of the picture is the western temple. To the right of it is the Mukutu (or Tok or Little) Mesa Valley, and across it is the eastern temple. On the extreme right is the opening of the Pariautwap. In the middle distance is the inner Cañon of the Virgin.



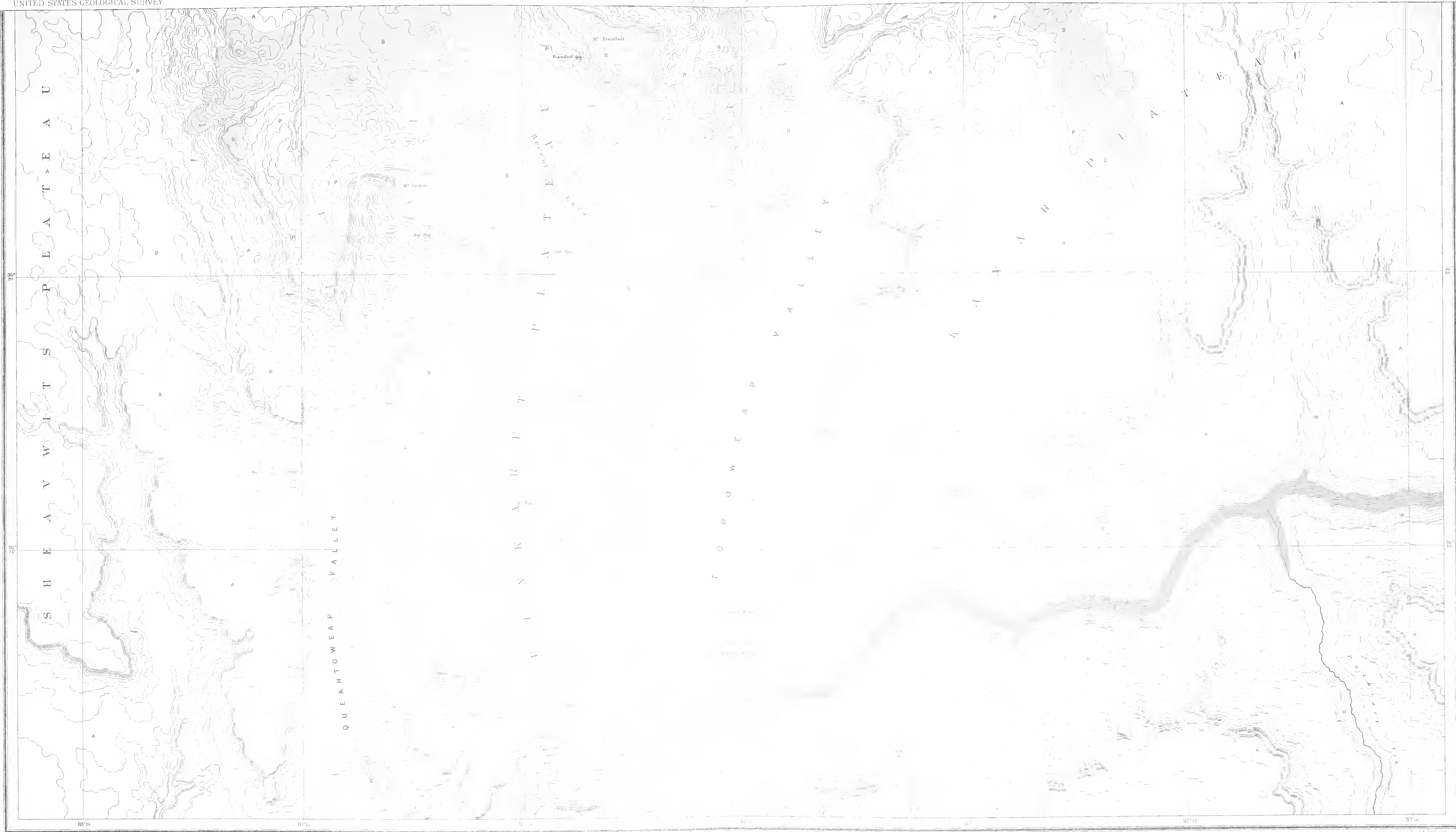
The two Views are continuous. On the left are seen the cascades of lava descending from the Craters upon the heights of the Unimari, with intervening pediments of upper Carboniferous strata. The effect of the fault is shown by the greater height of the eastern wall in the lower view.

LOOKING UP THE BOWOWEAP FROM MOUNTAIN'S THERM

In the upper View the great lava streams are seen descending from the Plateau wrapping around the fine table of Carboniferous strata and reaching to the brink of the inner gorge where they plunge into the bottom of the chasm.



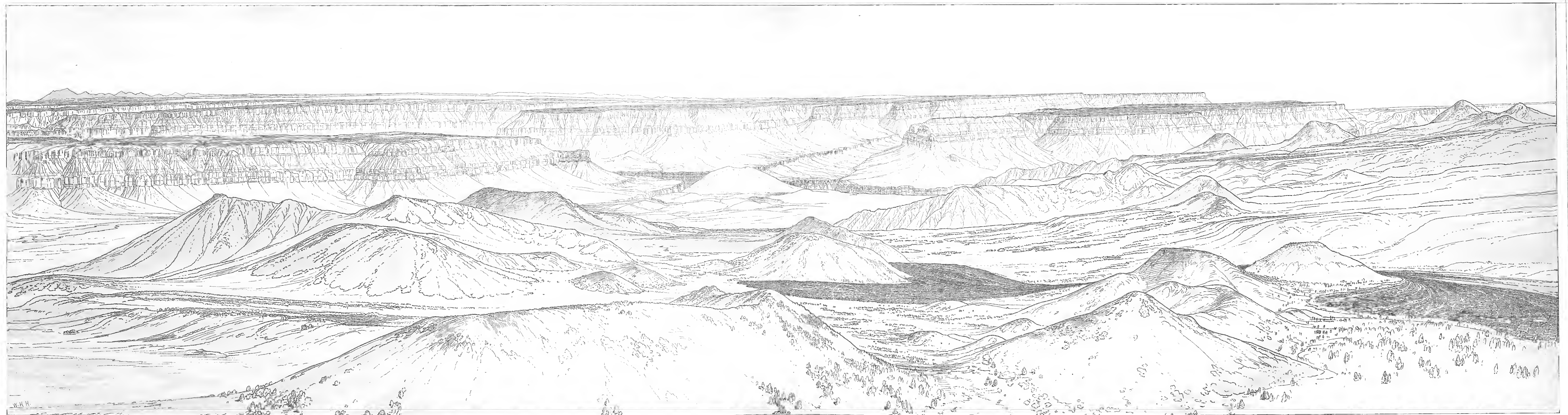
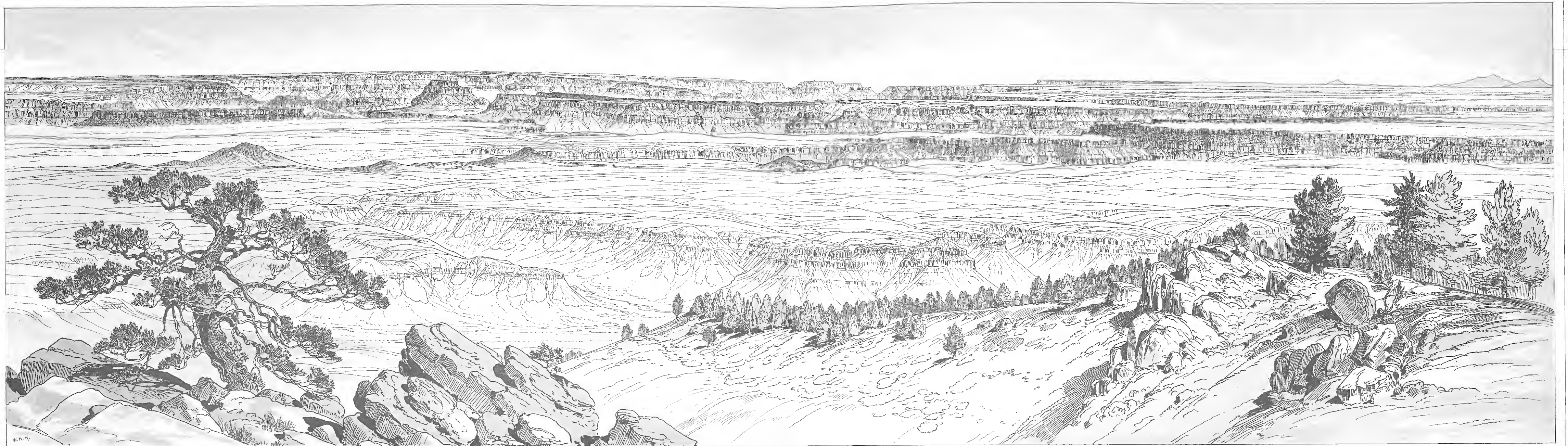
THE GRAND CAÑON AT THE FOOT OF THE TOROWEAP-LOOKING EAST



Scale 1 inch = 1 mile

Geological (1894)

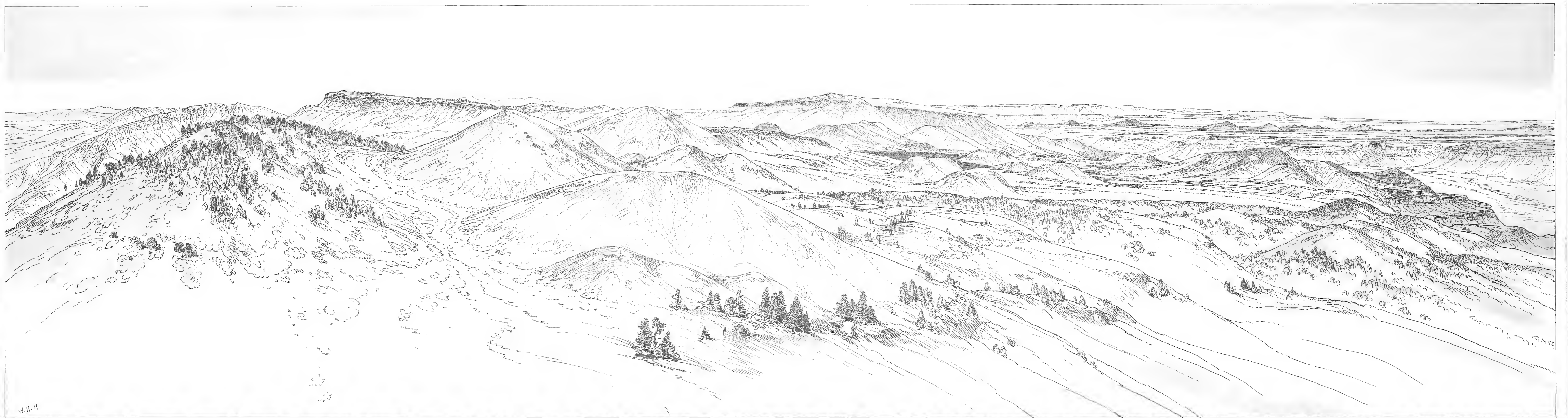
THE COLORADO PLATEAU



Upper View looking east. The Grand Cañon in the distance. Upon the horizon is the summit of the Kaibab. Glimpses of the Cañon in the Kaibab are given at distances varying from 15 to 35 miles. The opening of Kaibab Cañon is seen to the left. On the right Cataract Cañon is seen coming from the South. In the foreground is the upper part of the Toroweap Valley.

VIEWS LOOKING EAST AND SOUTH FROM THE GRAND CAÑON

Lower View looking south from a different standpoint of the Grand Cañon in the distance with the opening of the Kaibab Cañon to the left. Upon the brink of the gorge stands the Grand Cañon. The lower Toroweap Valley is seen to the left. South of the Cañon is another interval valley along which runs the Toroweap fault. Looking the other way on west (right) the fore and middle grounds are filled with many basaltic craters, the higher and red sands are very recent outpourings of basalt.



VIEW FROM THE GRAND CANYON DISTRICT, ARIZONA, LOOKING NORTH.
In the foreground and middle ground are the Grand Canyon. In the background is the northern part of the Sierrita Plateau and the Hurricane-Ledger horizon.
In the middle background is the cliff forming a part of the main Sierrita escarpment.
In the right background is the Vermilion Cliffs, 40 to 50 miles distant and 2,000 feet high.

VIEWS FROM MT. TRUMBULL AND MT. EMMA

VIEW FROM MT. TRUMBULL AND MT. EMMA, ARIZONA, LOOKING SOUTH.
In the foreground are the Grand Canyon and the Hurricane-Ledger horizon. In the background is the Sierrita Plateau, a rocky plateau with a high base, 12 miles long. On the horizon, 12 miles distant, is the forenoon of the background. All other distances are numerous, mostly under 100 miles. At the base of Trumbull is the base of the very recent lava.

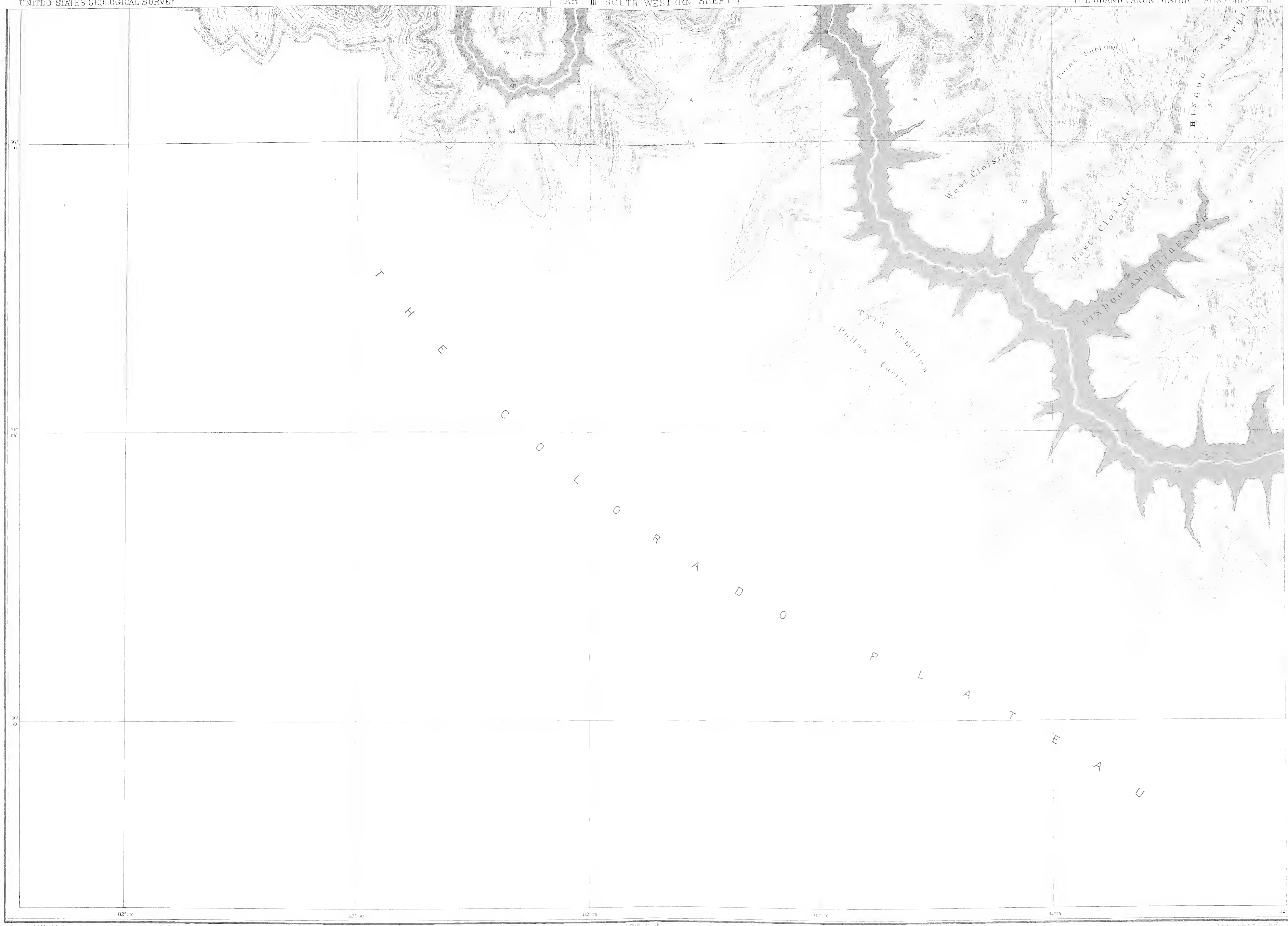


GEOLOGIC MAP OF THE SOUTHERN PART OF THE KAIBAB PLATEAU

The areas designated as Archæon contain numerous irregular masses of Silurian and probably other lower Paleozoic rocks which cannot be separated at present from the Archæon.

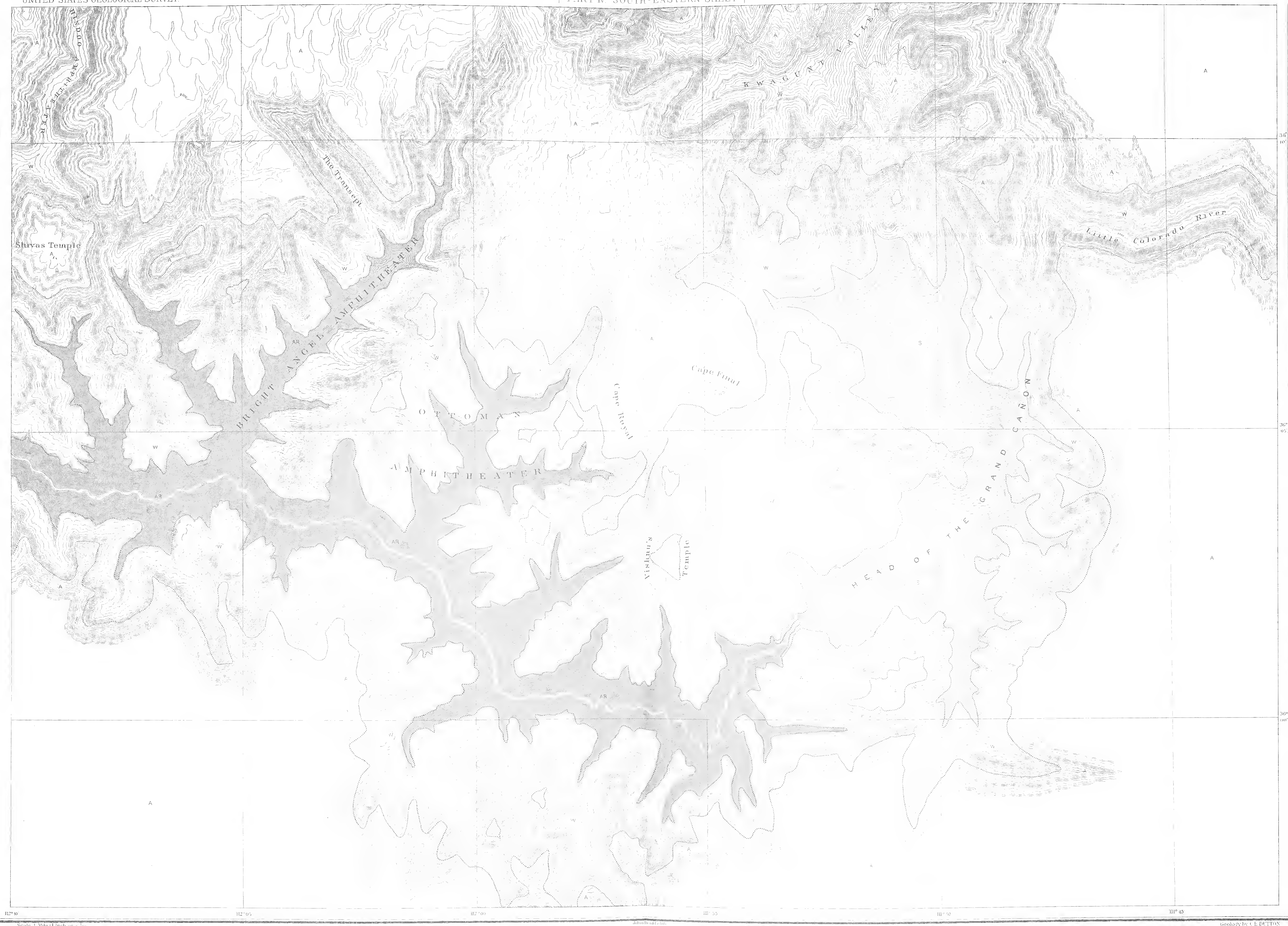
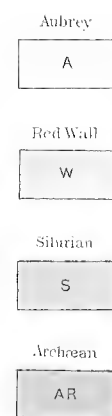
Geology by C. E. DUTTON

GEOLOGIC MAP OF THE SOUTHERN PART OF THE KAIBAB PLATEAU



GEOLOGIC MAP OF THE GRAND CAÑON IN THE KAIBAB PLATEAU

The areas designated as Archaean contain numerous irregular masses of Salinan and probably other lower Paleozoic rocks which cannot be separated at present from the Archaean.



112° 40'

112° 35'

112° 30'

112° 25'

112° 20'

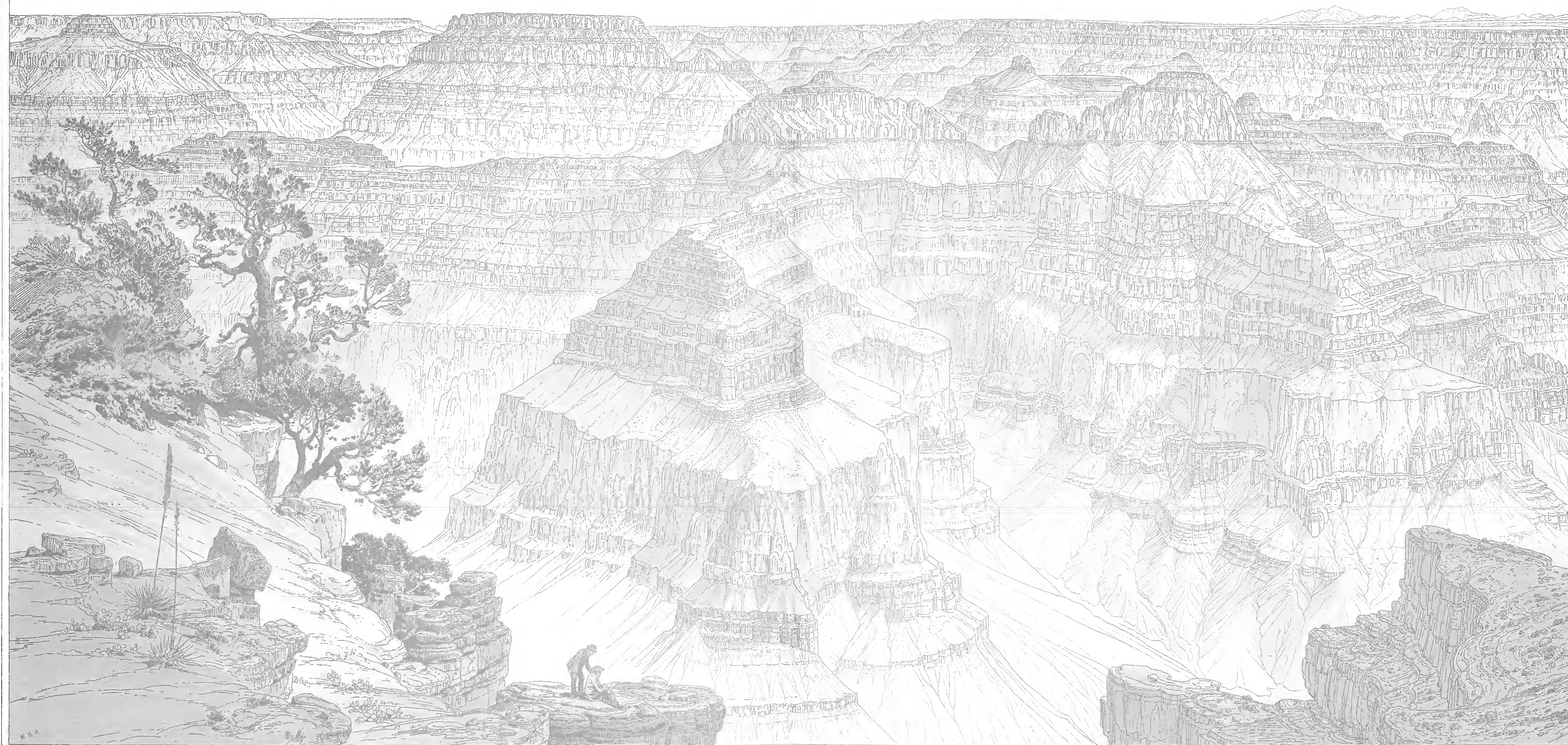
112° 15'

Scale 1 Mile = 1 inch on a 100

GEOLOGIC MAP OF THE SOUTHERN PART OF THE KAIBAB PLATEAU-HEAD OF THE GRAND CAÑON

The areas designated as Archean contain numerous irregular masses of Silurian and probably other lower Paleozoic rocks which cannot be separated at present from the Archean.

Geology by C. E. DUTTON



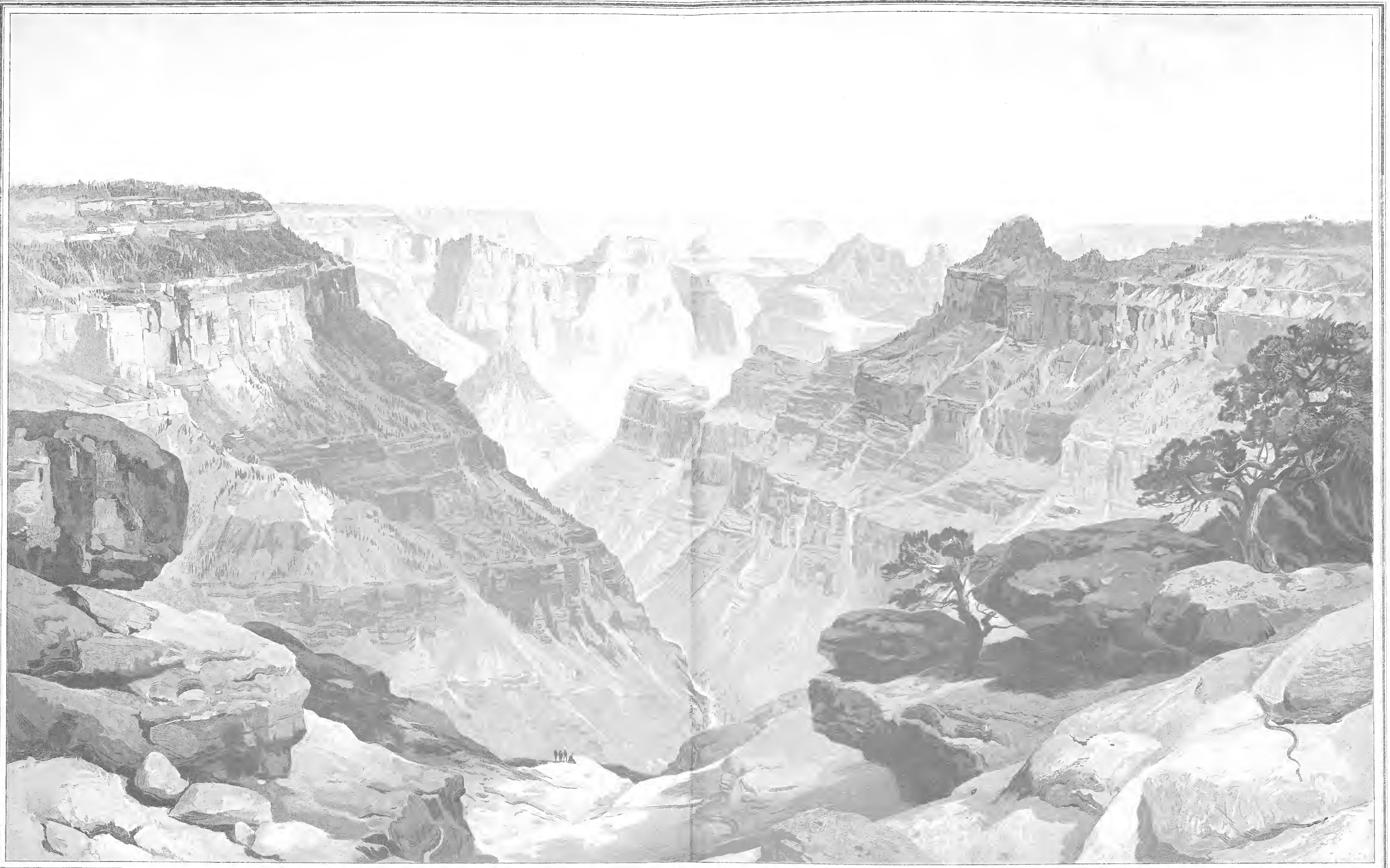
PANORAMA FROM POINT SUBLIME



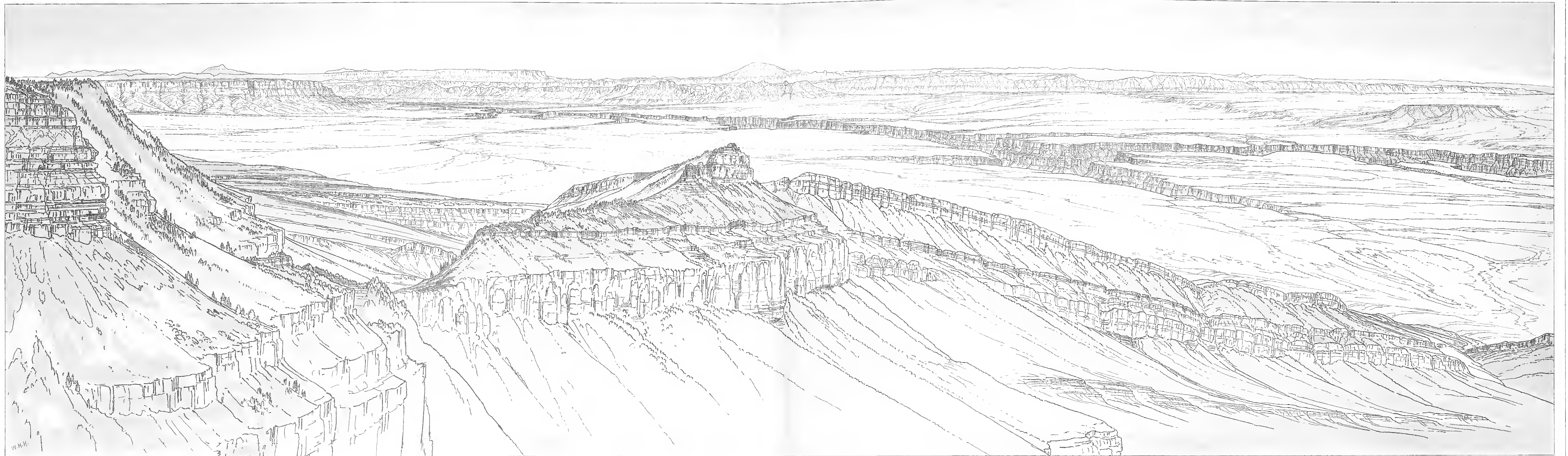
PANORAMA FROM POINT SUBLIME



PANORAMA FROM POINT SUBLIME



THE TRANSEPT, KAIBAB DIVISION, GRAND CAÑON
AN AMPHITHEATER OF THE SECOND ORDER



Upper View looking east-Lower View looking south-The two Views are continuous. The East Kaibab Monocline is immediately in front of the observer carrying the same geological horizon on which he stands down to the platform 2,500 to 3,000 feet below.

The Marble Canyon is seen in the middle distance and the Echo Cliffs in the background. The Triassic cliffs capping the Paria Plateau are seen in the background on the extreme left of the upper View.

VIEWS OF THE MARBLE CANYON PLATFORM FROM THE EASTERN BRINK OF THE KAIBAB



GEOLOGIC MAP SHOWING THE SOUTH-WESTERN PORTION OF THE MESOZOIC TERRACES

Lithologies

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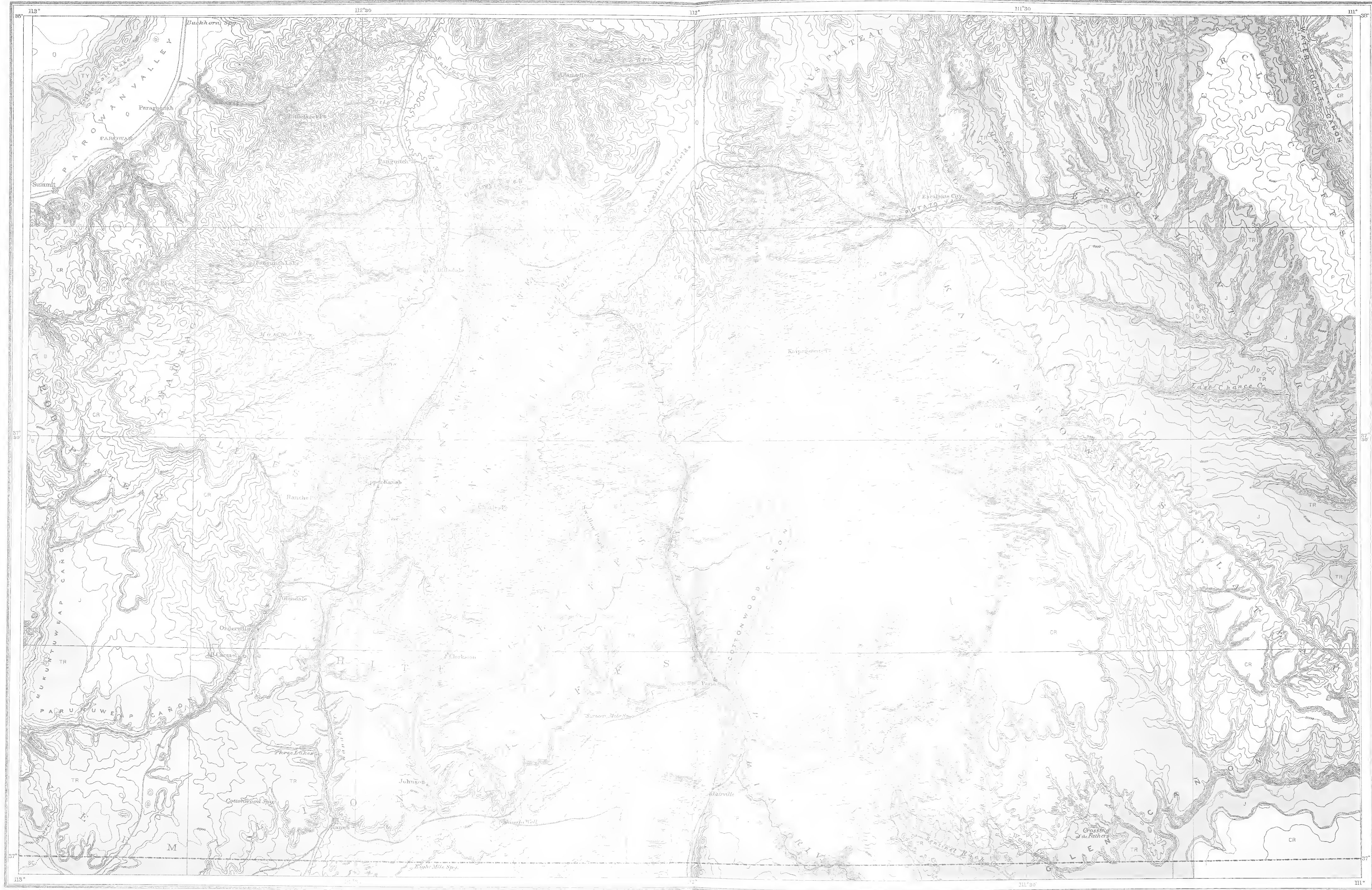
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Scale 1 inch = 10 miles

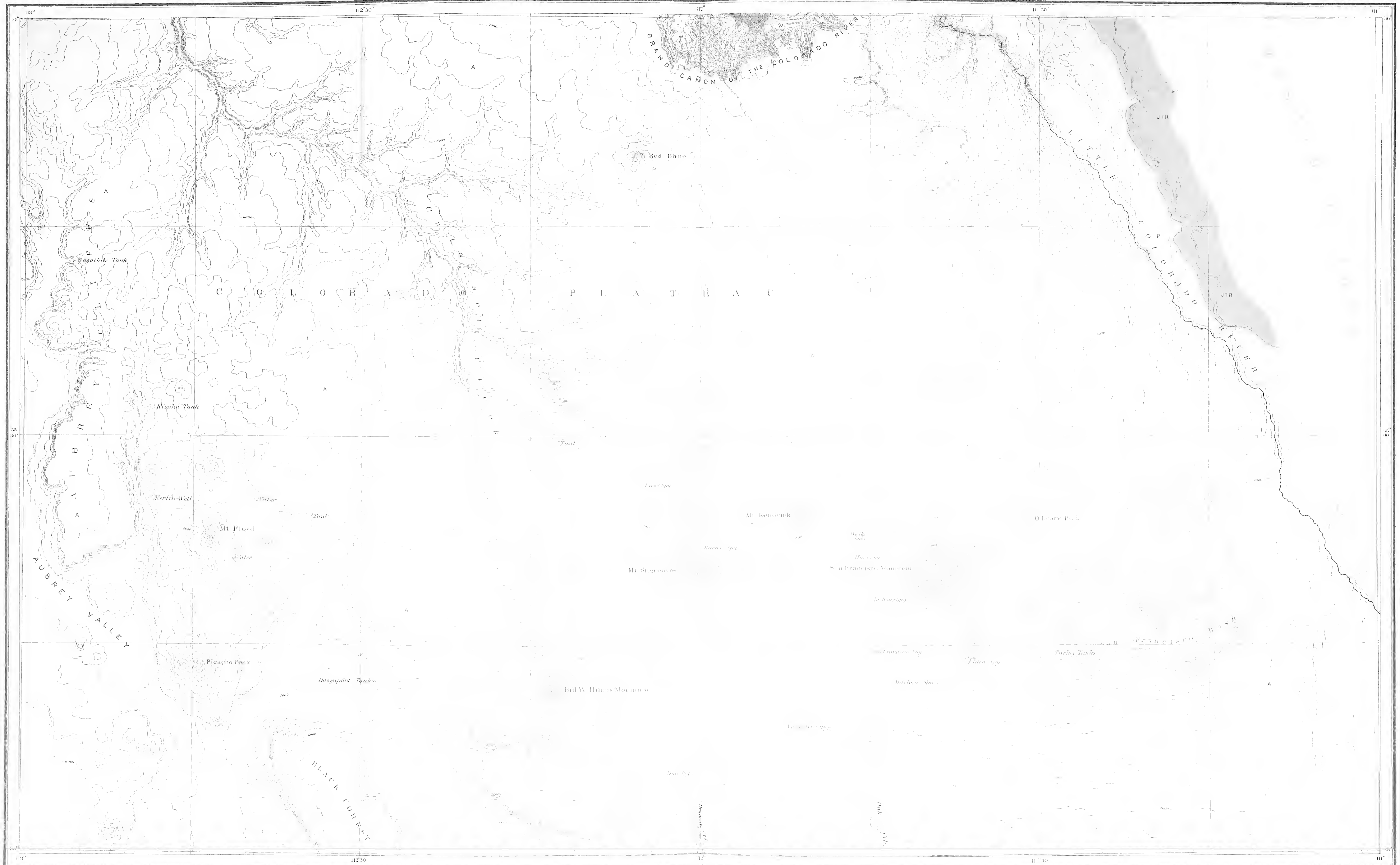
Geological Survey

ATLAS SHEET XI OF THE GEOLOGICAL SURVEY OF THE GRAND CANYON DISTRICT

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GEOLOGIC MAP SHOWING THE KAIBAB, KAIBAB, PARIA AND MARBLE CANYON PLATFORMS



Scale 1 inch = 4 miles

GEOLOGIC MAP OF THE COLORADO PLATEAU AND SAN FRANCISCO MOUNTAINS

This region has been well surveyed topographically, but has been geologically mapped only in the Grand Cañon. The colors here are to be received only as an approximation to the distribution of the units.

Archaean	Lower Carboniferous	Upper Carboniferous	Permian	Juratrias	Volcanic
AR	W	A	D	JTR	V

Geology by C. DUTTON



